Perihelion Time = Sept. 17·2228200 Greenwich Mean Time.

$$\left.\begin{array}{rl} \Omega = & 346^\circ\ 1'\ 7''\cdot91 \\ \pi - \Omega = & 69\ 36\ 12\cdot79 \\ i = & 141\ 59\ 52\cdot16 \\ \phi = & 89\ 7\ 42\cdot70 \\ \log a = & 1\cdot9331366 \\ \log q = & 7\cdot8904739 \\ \text{period} = & 793\cdot689 \text{ years} \end{array}\right\} 1882\cdot0$$

$$\delta\lambda \cos\beta = -0''\cdot06 \quad \delta\beta = +0''\cdot01$$

$$x = r\,[9\cdot9951411] \sin(170^\circ\ 42'\ 12''\cdot72 + v)$$
$$y = r\,[9\cdot9877234] \sin(262\ 46\ 57\cdot39 + v)$$
$$z = r\,[9\cdot4435130] \sin(\ 49\ 20\ 25\cdot11 + v)$$

The observations as given were afterwards corrected for parallax by means of elements previously computed. These elements bear a considerable resemblance to Comet I., B.C. 371; and it may possibly be its third return, a very brilliant comet having been seen in full daylight A.D. 363.

E. FRISBY,
Washington, Dec. 19, 1882 Prof. Math., U.S.N.

THE DUMAS MEDAL

WE recently (vol. xxvii. p. 174) gave the addresses at the Paris Academy of Sciences in connection with the presentation to M. Dumas of a medal in commemoration of the fiftieth anniversary of his election to the Academy. We are now able, by the courtesy of our French contemporary, *La Nature*, to reproduce an illustration of this medal, which was presented by M. Jamin in words both eloquent and touching, as a token of the "love and gratitude" of the distinguished chemists' *confrères*, pupils, and friends. The medal is the work of M. Alphée Dubois.

PROFESSOR VON GRAFF'S MONOGRAPH ON THE TURBELLARIANS[1]

THIS splendid folio monograph consists of two volumes, the one comprising the text of over 600 pages illustrated by woodcuts, the other twenty as beautifully executed partially coloured plates as have ever been turned out, all from the author's own original drawings. The publication of the work has been assisted by a grant from the Berlin Royal Academy of Sciences.

Ludwig von Graff is Professor of Zoology at the College of Forestry at Aschaffenburg, in Bavaria. His first memoir on Turbellarians was published in 1873, at which time he first made up his mind to work out from his own observation a revision of the Turbellarians. The present monograph is, as he tells us in the preface, the result of almost incessant work during the last five years. He has made numerous journeys to the Naples and Triest stations, and has also visited many other parts of the European coasts north and south, and the fresh waters in all directions, in order to pursue his investigations on living Turbellarians. He has thus been able himself to examine 70 out of the 168 species of Rhabdocœlida which are known with certainty. The work being thus founded on so wide a personal acquaintance with the forms of which it deals, is of especial weight and value; it constitutes a systematic monograph of the Rhabdocœlida, founded on a sound basis of anatomical structure, and embracing all species hitherto described by other observers, together with those discovered by the author himself (thirty new species).

It is doubtful whether the present work will be followed by a second part embracing in a similar manner all the known Dendrocœlida. The matter depends on the amount of ground which may be covered by Dr. A. Lang's forthcoming monograph on Turbellarians, in the "Fauna and Flora of the Gulf of Naples." If this monograph proves to be so comprehensive that a further one would be superfluous, then Prof. Graff will publish a quantity of material collected by him concerning the Dendrocœlida, in three smaller memoirs on the Polyclada, the Triclada, and embryology respectively. The present work is appropriately dedicated to the memory of O. F. Müller and Sir John Dalyell. It is pleasing to find the great merits of the latter thus recognised by a foreign naturalist.

The author does not admit Sidonia = *Rhodope varanii*, which, in opposition to Dr. R. Bergh, he considers to be a nudibranch, or Dinophilus, which has lately been shown to lie near the Archiannelids amongst the Turbellarians; and in the definition he gives of the group excepts the Microstomida, which differ from all other Turbellaria in having a complete periœsophageal nerve ring, in being diœcious, and in multiplying asexually by budding.

Separating, as is now so usual, the Nemertines altogether from the Turbellarians, he divides the group into the Rhabdocœlida and Dendrocœlida. In the definition given of the two sub-orders, an interesting point of difference is brought out, namely, that in the former the yelk glands are always present in the form of a pair of compact glands, whereas in the latter they are always divided up into numerous separate follicles.

The Rhabdocœlida are divided by the author into three groups: I. Acœla; II. Rhabdocœla; III. Alloiocœla, which are thus defined:—

[1] "Monographie der Turbellarien." 1. Rhabdocœlida. Dr. Ludwig von Graff. (Leipzig: W. Engelmann, 1882.)

1. Acœla. With digestive internal substance; without differentiation of a digestive tract and parenchym tissue. Without nervous system or excretory organs. All forms as yet known provided with an otolith.

2. Rhabdocœla. Digestive tract and parenchym tissue differentiated; a roomy body cavity usually present in which the regularly-shaped intestine is suspended by a small amount of parenchym tissue. With nervous system and excretory organ. Generative organs hermaphrodite (except in Microstoma and Stenostoma). Testes, as a rule, two compact glands. The female glands present as ovaries only, ovario-vitelligenous glands, or separate ovaries and yelk glands. Genital glands separated from the body parenchym by a special tunica propria. Pharynx always present, and very variously constructed. Otolith absent in most cases.

3. Alloiocœla. Digestive tract and parenchym tissue differentiated, but the body cavity much reduced by the abundant development of the latter. With nerve system and excretory organ. Generative organs hermaphrodite, with follicular testes and paired female glands, either ovaries only, or ovario-vitelligenous glands, or separate ovaries and yelk glands. Yelk glands irregularly lobular, rarely partially branched. Genital glands almost always without any tunica propria, lodged in the spaces in the body parenchym. Penis very uniform, and either without chilinous copulatory organs, or with these very little developed. Pharynx a pharynx variabilis or plicatus. Digestive tract lobular, or irregularly broadened out. All marine except one, or possibly two species.

Under the Alloiocœla come the genera—Plagiostoma, Vorticeros, Monotus, and others.

The work commences with a complete list of the literature on Turbellarians from the time of Trembley, who, in 1744, figured a black fresh-water Planarian to that of the publication of the last of Dr. Arnold Lang's important memoirs last year. The list is followed by a general treatise on the anatomy and physiology of the Rhabdocælida. The account of the nematocysts of some forms is very interesting; their exact resemblance to those of Cœlenterata is fully borne out. *Microstonum lineare* appears to be the only species which, like Hydra and Cordylophora, possesses two kinds of nematocysts. The author thinks he has been able to detect on the surface of the cuticle, trigger hairs in connection with the nematocysts, like those in Hydroids. He considers the rhabdites or rod-bodies homologous with nematocysts, and refers, in connection with this question, to the nematocysts devoid of any thread which occur in many Cœlenterates, intermingled with fully developed ones. The structure of the pharynx is carefully gone into, and its different forms being of much use in classification, receive various names, such as *Pharynx bulbosus*, *P. plicatilis*, &c.

The water vascular system has been studied by von Graff with considerable success. It may consist of a single median main canal with a single posterior opening (Stenostoma) or a pair of laterally-placed canals with a similar single opening or two separate lateral canals with each a posterior opening (Derostoma), or there may be a pair of openings or a single one somewhat anteriorly placed. Ciliated funnel cells or flame cells such as exist in Cestodes, Trematodes, and Triclad Dendrocœles, have been discovered by von Graff also in the Rhabdocœlida. They do not, however, occur in connection with the tips of the ramifications of the water vascular canals, but almost entirely on the larger canals forming the networks. It is impossible here to follow the work further, through the interesting sections devoted to the development of Microstoma by budding, the habits of life and geographical distribution of the Rhabdocælida. In connection with the discussion on classification, a table of the pedigree of Turbellaria is given, with Proporus as the ancestral starting-point. In this family tree the Dendrocœles are shown as derived from Acmostoma, a new genus of Alloiocœla, characterised by having a distinctly marked narrow ambulacral sole, the Polyclada directly, and the Triclada through Plagiostoma. The ascertained facts as to the structure of Turbellarians seem to point even more closely to their connection with the Cœlenterata. The presence of two kinds of nematocysts in one of the Rhabdocœla and possible occurrence in members of that group of trigger hairs, is a remarkable fact. Dr. Lang, believing that a part of the nervous system in Dendrocœles is truly mesenchymatous as in Ctenophora, and from other grounds concludes with Kowalewsky that the Polyclada are "creeping Cœlenterates which have many points of structure in common with the Ctenophora, some with the Medusæ. Such being the case, naturalists await with great impatience Kowalewsky's promised further information as to his extraordinary Cœloplana, supposed intermediate between Ctenophora and Dendrocœlida. The peculiar azygos character of the otolith in so many Dendrocœlida may perhaps be explained by the similar condition of the sense organ in Cœloplana. Prof. von Graff is much to be congratulated on the completion of this most important and admirable work.

H. N. MOSELEY

NOTES

WE greatly regret to announce the death of Mr. Charles V. Walker, F.R.S., at his residence at Tunbridge Wells, on the morning of December 24, 1882, in the seventy-first year of his age. Mr. Walker had been Telegraph Engineer to the South-Eastern Railway, since 1845. He had been a most zealous worker in the science of electricity, as the many works he leaves behind will testify. Indeed, he was one of the oldest telegraph engineers in the country, was the inventor of several useful appliances in connection with telegraphy, including the instruments by which the block system on railways is worked. His name is especially associated with the origin of the distribution of time by telegraph. On May 10, 1849, Mr. Glaisher wrote to Mr. Walker that he wished to talk with the latter about the laying down of a wire from the Observatory to the Lewisham Station, and on May 23 following, the Astronomer-Royal gave Mr. Walker a brief sketch of the use to be made of the wire referred to, his scheme, as he stated, being "the transmission of time by galvanic signal to every part of the kingdom in which there is a galvanic telegraph from London." It was proposed to lay four wires underground from the Royal Observatory to the railway station at Lewisham, and to extend them to London Bridge. The South-Eastern Railway Company gave every facility. On September 16, 1852, an electric clock at London Bridge Station was erected, and connected by wire with an electric clock at the Royal Observatory, Greenwich. The first time-signal sent from the Royal Observatory was received at London Bridge Station at 4 p.m. on August 5, 1852; and on August 9, 1852, Dover received a time-signal for the first time from the Royal Observatory direct, and it was made visible at certain first-class stations between London and Dover. After that the system rapidly spread, its success depending greatly on the scientific skill and enthusiasm of Mr. Walker. For some account of the subsequent development of the system, the reader may refer to the articles in NATURE, vol. xiv. pp. 50 and 110. Mr. Walker was treasurer of the Royal Astronomical Club for several years, and at the time of his death was president of the Society of Telegraph Engineers.

THE death is announced of Prof. Listing of Königsberg.

THE honour of Companion of the order of the Indian Empire has been conferred upon Surgeon-Major George Bidie, Superintendent of the Central Museum at Madras.